



## Evaluation of Hepatitis B Vaccination Coverage of Patients Seen at the Abéché University Hospital, Chad

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### Abstract

**Introduction:** Hepatitis B is a viral infection caused by the hepatitis B virus, which leads to inflammation of the liver. Infection with the hepatitis B virus (HBV) is a major public health problem, with more than 250 million chronically infected people worldwide at high risk of cirrhosis and hepato cellular carcinoma.

**Objective:** To contribute to a better understanding of vaccination coverage against the hepatitis B virus at the University Hospital of Abéché, Chad.

**Material and Methods:** This prospective analytical study was carried out on a population of 808 consenting patients aged between 14 and 60 years, from 1 April to 31 December 2023, using the enzyme-linked immunosorbent assay (ELISA) to determine antibodies to the hepatitis B virus surface antigen.

**Results:** Before our study, we found 3 cases (0.37%), including 2 (0.25%) males and 1 (0.12%) female, in a population of 808 samples. After our study, 44 vaccinated cases were identified with a vaccination rate of (5.44%), including 25 (3.09%) males and 19 (2.35%) females.

**Conclusion:** We note that ignorance of the hepatitis B virus and its transmission routes are factors that favour its spread in Abéché. This could be explained by the low rate of people vaccinated, with 3 cases (0.37%) before the study, after awareness-raising, vaccination coverage increased to 5.44% (44 cases vaccinated).

**Keywords:** Vaccination Coverage; HBV; ELISA; Ouaddaï; Chad

### Abbreviations

HBV: Hepatitis B Virus; ELISA: Enzyme Linked Immuno Sorbent Assay; Ag: Antigen; Ac: Antibody; PCR: Polymerase Chain Reaction; ALAT: Alanine Aminotransferase; ASAT: Aspartate Aminotransferase

### Introduction

Hepatitis B is a viral infection caused by the hepatitis B virus, which leads to inflammation of the liver. Infection with the hepatitis B virus (HBV) is a major public health problem, with more than 250 million chronically infected people worldwide at high risk of

cirrhosis and hepatocellular carcinoma. Hepatitis B is one of the most widespread diseases in the world, according to the World Health Organisation [1].

HBV infection is characterised by acute hepatitis, usually without symptoms, and chronic hepatitis. The prevalence of infection is low in Western Europe, Australia and North America, where the carriage rate is between 0.1-0.5%. This prevalence is very high in tropical Africa and South-West Asia, where the frequency of chronic carriage can reach 20% of the population. Vertical transmission is common among asymptomatic women who are unaware that they are carriers. The high contagiousness of the hepatitis B virus is linked to its presence in most biological fluids [2].

The mechanism of vaccination is based on the induction of neutralizing antibodies, the aim of which is to block the penetration of viral Ag into the body during the initial period of the HBV cycle. It is currently considered that the immune system, once it is capable of producing protective Ac against HBV, will be able to induce protection in the event of contamination, through an immune memory mechanism [3].

However, by 2021, only 14 of the 47 African countries had introduced routine hepatitis B vaccination at birth, and only 17% of newborns in Africa had received a dose of hepatitis B vaccine. Preventing chronic HBV infection and associated deaths in Africa requires improved coverage (Henry N., *et al.* 2022).

To contribute to a better understanding of the hepatitis B vaccination situation in the province of Ouaddaï, city of Abéché, Chad.

In the town of Abéché, in Chad's Ouaddaï province, vaccination against the hepatitis virus is very low, almost non-existent. There is no vaccination programme available in our health services, and the majority of people in various health institutions are not vaccinated. There is almost no availability of the vaccine in the town of Abéché, except in certain private medical services, which is expensive for the population. There is a problem storing the vaccine, simply because the electricity is not permanent.

The low level of awareness of the hepatitis B vaccine has led to mistrust among the population, who often prefer to treat the disease with drugs. Erroneous beliefs associating vaccines with the onset of disease contribute to this reluctance.

This study is original in that it focuses on hepatitis B vaccination coverage in the town of Abéché, Ouaddaï province, Chad.

## Materials and Methods

Our study was carried out in the town of Abéché in the Republic of Chad. The research was carried out at the Centre Hospitalier Universitaire d'Abéché, Adam Barka University, Abéché, Chad. The study involved all patients who were seen in consultation and who voluntarily agreed to undergo the study. Sampling was simple random (n = 808).

## Epidemiological variables

- Sex
- Ages
- Profession

## Ethical considerations

This study was conducted after obtaining the agreement of the head physician and the heads of the various departments of the hospital centre. All participants gave their free and informed written consent before taking part. The data collected were treated confidentially and anonymously.

## Data collection and analysis

Our study was conducted as follows:

- **Stage 1:** Drafting of a tested, amended and validated questionnaire.
- **Stage 2:** Survey proper.
- **Stage 3:** Sampling
- **Stage 4:** An Excel database for analysis.

## Limitations and difficulties

The difficulties encountered include

- Lack of confidence on the part of patients to tell their story correctly;
- Patients' reluctance to accept vaccination, which they see as a source of illness;
- Lack of certain analyses (viral load, PCR, etc.);
- Lack of vaccine availability;
- Lack of knowledge about the virus.

### Results

The application of the research methodology led to the following results, in the form of figures and tables, interpreted, commented on and discussed according to the available literature data.

During the study period, 808 patients were screened at the Abéché University Hospital. The majority were male, 50.62% (Figure 1).

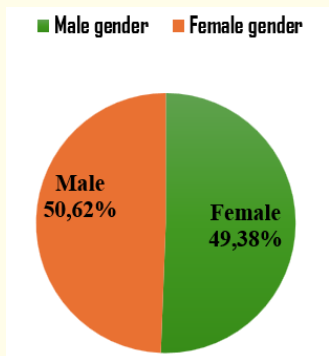


Figure 1: Distribution of samples by sex.

During the study period, we obtained a total of 808 samples in the town of Abéché.

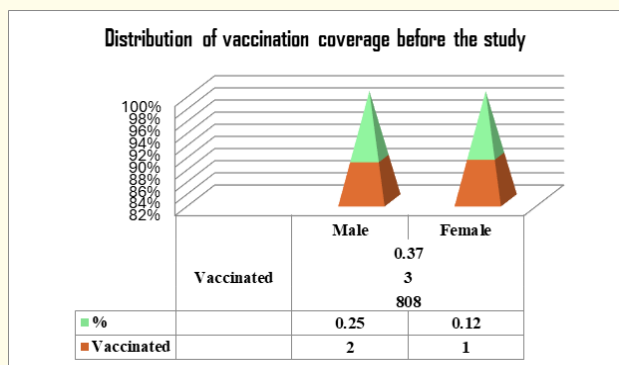


Figure 2: Distribution of vaccination coverage before the study.

Prior to our study, vaccination coverage in a population of 808 samples was 3 cases (0.37%), of which 2 (0.25%) were males and 1 (0.12%) was a female.

Graph showing the percentage of people vaccinated as a function of the sample taken after the study

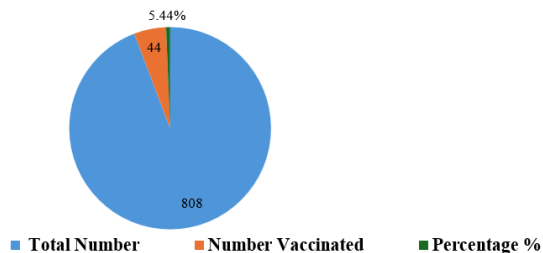


Figure 3: Graph showing the percentage of people vaccinated as a function of the sample size.

The graph shows that out of 808 samples taken, 44 people were vaccinated, giving a percentage of 5.44 after the study. This could be due to the impact of raising public awareness of the importance of vaccination.

Breakdown of people vaccinated by age group

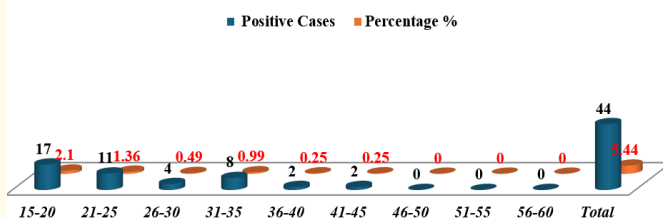


Figure 4: Breakdown of vaccinated people by age group.

The 15-20 age group, with 17 cases (2.1%), was the most affected, followed by the 21-25 age group (1.36%), the 31-35 age group (0.99%) and the 26-30 age group (0.49%). The lowest percentage was found in the 36-40 and 41-45 age groups (0.25% each).

The graph shows that the socio-professional category most affected was students, with 21 cases (2.60%), followed by pupils (1.73%) and teachers (0.62%). The lowest rates were found among house wives, shopkeepers, military personnel and livestock farmers, with 0.12% each.

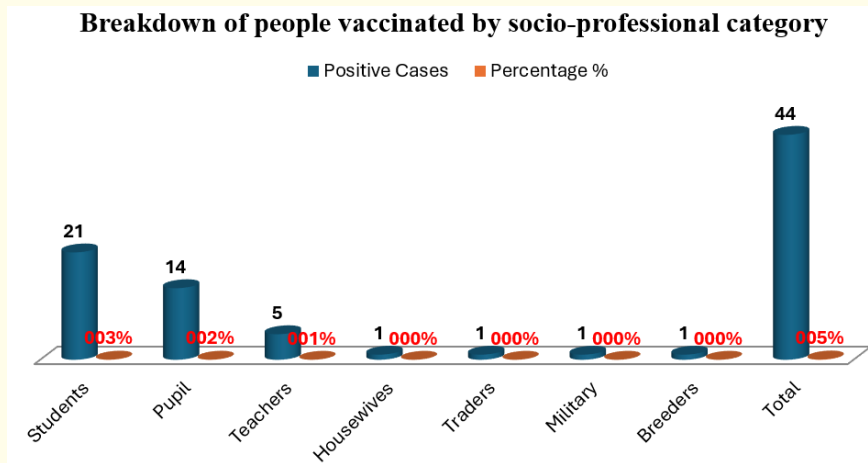


Figure 5: Breakdown of people vaccinated by socio-professional category.

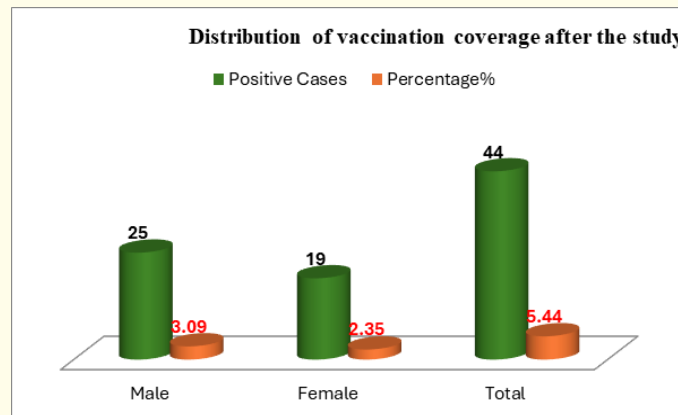


Figure 6: Distribution of vaccination coverage after the study.

Of the 44 people vaccinated after the study, 25 (3.09%) were male and 19 (2.35%) female.

Biochemical parameters	Values						Total	
	Low		Normal		High			
	Effective	%	Effective	%	Effective	%	Effective	%
ALAT	0	0	73	75.26	24	24.74	97	99.99
ASAT	1	1.03	70	72.16	26	26.80		

Table 1: Pathophysiological variations in biochemical parameters in patients with HBV.

In this table, we see that the ASAT and ALAT levels are higher than the norm, which indicate liver damage and may be signs of a potentially serious disorder such as: Liver disorder linked to alcohol consumption. Chronic or acute viral hepatitis.

Elevated transaminases in a hepatitis B positive patient maybe due to liver damage. Elevated AST may indicate damage to myocardial cells, often in relation to health problems such as myocardial infarction, heart failure or myopathy.

## Discussion

Anti-HBV vaccination coverage was 0.37% (n = 3) in patients undergoing consultation before the study and after the study 5.44% (n = 44) were immunised.

The socio-professional category most affected was that of students, and the 15-20 age group was the most affected.

This could be due to the impact of patient awareness of the importance of vaccination.

This prevalence is lower than that observed in the study by Fanou Denis, *et al.* [3], which assessed hepatitis B vaccination status and HBsAg carriage among Beninese military personnel on mission in Côte d'Ivoire (9.1%). It is also lower than the overall vaccination coverage rate of 21.7% observed in France as part of the development of hepatitis B vaccination strategies [4].

This low prevalence rate observed in this study could be due to inadequate conditions of access to vaccination services, poor perception and acceptance of vaccination, limited vaccination strategies and low awareness.

The prevalence observed is higher than the 3.7% vaccination coverage rate reported among students at Cocody University in Côte d'Ivoire [5] and the 2% rate observed among firefighters in Côte d'Ivoire [6].

This difference could be explained by the impact of the awareness-raising carried out among our study population on the importance of vaccination, with different rates observed before and after the study.

Further studies are needed to confirm these notions and possibly change ideas about modes of HBV transmission in Chad [7,8].

## Conclusion

In conclusion, we can conclude that the low vaccination coverage in the town of Abéché is linked to insufficient knowledge of the hepatitis B virus among the population. This enabled us to determine the knowledge, attitudes in the event of exposure and practices of consultants in terms of protection against viral hepatitis B.

The population's lack of knowledge about the virus and its routes of contamination is a factor that favours the spread of hepatitis B disease in Ouaddaï province during the course of our study.

## Source of Funding

Own funds.

## Conflicts of Interest

None.

## Authors' Contributions

All the authors contributed to this study. They have read and approved the final version of the manuscript.

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